

Amendments to the Claims:

This listing of claims will replace all prior versions and listing of claims in the application.

Listing of Claims:

1.-20. (Canceled)

21. (Currently Amended) A storage system comprising:
a plurality of disk drives;
at least one logical volume configured by said disk drives;
a plurality of processor adapters each having at least one processor
and controlling to store data, which are sent from at least one or more host
computers to said logical volume for updating said logical volume, in said disk drive;
a plurality of first interface adapters each coupled to said at least one ~~said~~
host computer and receiving a write request and data sent from said at least one
host computer and sending a first control information related to said write request to
at least one of said processor adapters and sending data received at each of said
first interface adapters based on a second control information sent from said at least
one processor adapter;
a memory adapter having at least one memory, said memory temporarily
storing data sent from said first interface adapters;
a plurality of second interface adapters each receiving data stored in said
memory adapter from said memory adapter based on a third control information sent

from said at least one processor adapter and storing data received at each of said second interface adapters in said disk drives; and

a switch adapter coupled to said processor adapters, said first interface adapters, said memory adapter and said second interface adapters and relaying data between said first interface adapters and said memory adapter and relaying data between said memory adapter and said second interface adapters;

wherein said switch adapter relays said first and said second control information between said processor adapters and said first interface adapters and relays said third control information between said processor adapters and said second interface adapters,

wherein the number of said processor adapters are increased or decreased based on a required performance.

22. (Previously Presented) The storage system according to claim 21 wherein:

said processor adapters are independently attached to or detached from said first interface adapters.

23. (Previously Presented) The storage system according to claim 21 wherein:

said processor adapters are assigned to a process of at least one said first interface adapter and a process of at least one said second interface adapter.

24. (Previously Presented) The storage system according to claim 21

wherein:

said at least one processor adapter is assigned to said plurality of first interface adapters.

25. (Previously Presented) The storage system according to claim 21

wherein:

said at least one processor adapter is assigned to said plurality of second interface adapters.

26. (Previously Presented) The storage system according to claim 21

wherein:

it is possible to increase or decrease the number of said processor adapters in case that the number of said first interface adapters is not increased or decreased.

27. (Previously Presented) The storage system according to claim 26

wherein:

it is possible to change the number of said processor adapters on storing data in said disk drives.

28. (Previously Presented) The storage system according to claim 21
wherein:

the number of said processor adapters is increased or decreased in
accordance with the number of said first interface adapters being increased or
decreased.

29. (Previously Presented) The storage system according to claim 21
wherein:

a first portion of said processor adapters are assigned to a process of at least
one of said first interface adapters,

a second portion of said processor adapters are assigned to a process of at
least one of said second interface adapters, and

a proportion between said first portion and said second portion is decided in
accordance with a proportion between a performance of said at least one first
interface adapter and a performance of said at least one second interface adapter.

30. (Previously Presented) The storage system according to claim 21
wherein:

said first control information is used to notify said at least one processor
adapter of receiving said write request.

31. (Previously Presented) The storage system according to claim 21

wherein:

said at least one processor adapter detects an area of said memory in which data of said logical volume need to be stored in accordance with said received first control information.

32. (Previously Presented) The storage system according to claim 21

wherein:

said second control information includes information related to an area of said memory in which data received at said first interface adapter need to be stored.

33. (Previously Presented) The new storage system according to claim 21

wherein:

said at least one processor adapter finds an area of said disk drives related to said logical volume for storing data of said logical volume based on said received first control information.

34. (Previously Presented) The storage system according to claim 21

wherein:

said third control information includes information related to an area of said disk drives in which data received at said second interface adapter need to be stored.

35. (Currently Amended) The A storage system according to claim 21 wherein:

said at least one processor adapter controls to create a parity data of RAID (Redundant Array of Inexpensive Disks) from data received at-at least one of said first interface adapters.

36. (Currently Amended) A storage system coupled a host computer, said storage system comprising:

at least one disk drive;

at least one logical volume configured by said at least one disk drive;

a processor adapter having at least one processor and controlling to store data by determining a location at which the data should be stored, the data being which are sent from said host computer to said logical volume for updating said logical volume, in said disk drive;

a first interface adapter coupled to said host computer and receiving a write request and data sent from said host computer and sending a first control information related to said write request to said processor adapter and sending data received at said first interface adapter based on a second control information sent from said processor adapter;

a memory adapter having at least one memory, said memory temporarily storing data sent from said first interface adapter;

a second interface adapter receiving data stored in said memory adapter from said memory adapter based on a third control information sent from said processor adapter and storing data received at said second interface adapter in said disk drive; and

a switch adapter coupled to said processor adapter, said first interface adapter, said memory adapter and said second interface adapter and relaying said data among said first interface adapter, said memory adapter and said second interface adapter;

wherein said switch adapter relays said first and said second control information between said processor adapter and said first interface adapter and relays said third control information between said processor adapter and said second interface adapter; and

wherein the number of said processor are increased or decreased, if the number of said first interface adapter, said memory adapter and said second interface adapter are not increased or decreased.

37. (Currently Amended) A storage system coupled a host computer, said storage system comprising:

at least one disk drive;

at least one logical volume configured by said at least one disk drive;

a processor adapter having at least one processor and controlling to store data by determining a location at which the data should be stored, the data being, which

are sent from said host computer to said logical volume for updating said logical volume, in said disk drive;

a first interface adapter coupled to said host computer and receiving data sent from said host computer and sending data received at said first interface adapter based on a first control information sent from said processor adapter;

a memory adapter having at least one memory, said memory temporarily storing data sent from said first interface adapter;

a second interface adapter receiving data stored in said memory adapter from said memory adapter based on a second control information sent from said processor adapter and storing data received at said second interface adapter in said disk drive; and

a switch adapter coupled to said processor adapter, said first interface adapter, said memory adapter and said second interface adapter and relaying data of said logical volume among said first interface adapter, said memory adapter and said second interface adapter and not relaying data of said logical volume to said processor adapter;

wherein said switch adapter relays said first control information between said processor adapter and said first interface adapter and relays said second control information between said processor adapter and said second interface adapter, and

wherein it is possible to change the number of said processor adapter on storing data in said disk drive.

38. (Currently Amended) A storage system coupled a host computer, said storage system comprising:

- at least one disk drive;
- at least one logical volume configured by said at least one disk drive;
- a processor adapter having at least one processor and which controls to store data by determining a location at which the data should be stored, the data being, which are sent from said host computer to said logical volume for updating said logical volume, in said disk drive;
- a first interface adapter coupled to said host computer;
- a memory adapter having at least one memory, said memory temporarily storing data sent from said first interface adapter;
- a second interface adapter coupled to said first interface adapter, said processor adapter, and said memory adapter; and
- a switch adapter coupled to said processor adapter, said first interface adapter, said memory adapter, and said second interface adapter,

wherein said switch adapter relays data between said first interface adapter and said second interface adapter via said memory adapter among said first interface adapter, said processor adapter, said memory adapter and said second interface adapter based on control information transferred among said first interface adapter, said processor adapter and said second interface adapter of said first interface adapter, said processor adapter, said memory adapter, and said second interface adapter, and

wherein the number of a plurality of processor adapters, which each correspond to said processor adapter, are increased or decreased.

39. (Currently Amended) A storage system coupled a host computer, said storage system comprising:

at least one disk drive;

at least one logical volume configured by said at least one disk drive;

a processor adapter having at least one processor and controlling to store data by determining a location at which the data should be stored, the data being, which are sent from said host computer to said logical volume for updating said logical volume, in said disk drive;

a first interface adapter coupled to said host computer and receiving a write request and data sent from said host computer and sending a first control information related to said write request to said processor adapter and sending data received at said first interface adapter based on a second control information sent from said processor adapter;

a memory adapter having at least one memory, said memory temporarily storing data sent from said first interface adapter; and

a second interface adapter receiving data stored in said memory adapter from said memory adapter based on a third control information sent from said processor adapter and storing data received at said second interface adapter in said disk drive;

wherein said processor adapter coupled to said first interface adapter and said second interface adapter and sends said second control information to said first interface adapter and sends said third control information to said second interface adapter,

wherein said first interface adapter sends data to said memory adapter among said processor adapter, said memory adapter and said second interface adapter,

wherein said second interface adapter receives data from said memory adapter among said processor adapter, said memory adapter and said first interface adapter, and

wherein said memory adapter receives data from said first interface adapter and said second interface adapter among said processor adapter, said first interface adapter and said second interface adapter, and

wherein the number of a plurality of processor adapters, which each correspond to said processor adapter, are increased or decreased based on a required performance.

40. (Currently Amended) A storage system coupled a host computer, said storage system comprising:

a plurality of disk drives;

at least one logical volume configured by said disk drives;

at least one processor adapter having at least one processor and controlling to store data by determining a location at which the data should be stored, the data

~~being, which are~~ sent from said host computer to said logical volume for updating said logical volume, in said disk drives;

at least one first interface adapter coupled to said host computer and receiving data sent from said host computer and sending data received at said first interface adapter based on a first control information sent from said processor adapter;

a memory adapter having at least one memory, said memory temporarily storing data sent from said first interface adapter; and

at least one second interface adapter receiving data stored in said memory adapter from said memory adapter based on a second control information sent from said processor adapter and storing data received at said second interface adapter in said disk drives;

wherein said processor adapter coupled to said first interface adapter and said second interface adapter and sends said first control information to said first interface adapter and sends said second control information to said second interface adapter,

wherein said first interface adapter sends data of said logical volume to said memory adapter among said processor adapter, said memory adapter and said second interface adapter,

wherein said second interface adapter receives data of said logical volume from said memory adapter among said processor adapter, said memory adapter and said first interface adapter, and

wherein said memory adapter receives data of said logical volume from said first interface adapter and said second interface adapter among said processor adapter, said first interface adapter and said second interface adapter, and

wherein the number of said processor adapter is increased or decreased in accordance with the number of said first interface adapter is increased or decreased.

41. (Currently Amended) A storage system coupled a host computer, said storage system comprising:

at least one disk drive;

at least one logical volume configured by said at least one disk drive;

a processor adapter having at least one processor and controlling to store data by determining a location at which the data should be stored, the data being, which are sent from said host computer to said logical volume for updating said logical volume, in said disk drive;

a first interface adapter coupled to said host computer and receiving data sent from said host computer and sending data received at said first interface adapter based on a first control information sent from said processor adapter;

a memory adapter having at least one memory, said memory temporarily storing data sent from said first interface adapter; and

a second interface adapter receiving data stored in said memory adapter from said memory adapter based on a second control information sent from said

processor adapter and storing data received at said second interface adapter in said disk drive;

wherein said processor adapter coupled to said first interface adapter, said memory adapter and said second interface adapter and sends said first control information to said first interface adapter and sends said second control information to said second interface adapter,

wherein said first interface adapter sends said data received at said first interface adapter to said memory adapter and does not send said data received at said first interface adapter to said processor adapter,

wherein said second interface adapter receives said data stored in said memory adapter from said memory adapter and does not receive said data stored in said memory adapter from said processor adapter, and

wherein said memory adapter receives said data sent from said first interface adapter and does not receive data from said processor adapter, and

wherein the number of a plurality of processor adapters, which each correspond to said processor adapter, are increased or decreased.

42. (Currently Amended) A storage system coupled a host computer, said storage system comprising:

at least one disk drive;

at least one logical volume configured by said at least one disk drive;

a processor adapter having at least one processor and controlling to read data by determining a location from which the data should be read, the data being, which are related to a read request sent from said host computer to said logical volume for reading data of said logical volume, from said disk drive;

a first interface adapter coupled to said host computer and receiving said read request and sending a first control information related to said read request to said processor adapter;

a second interface adapter receiving data stored in said disk drive from said disk drive based on a second control information sent from said processor adapter and storing data received at said second interface adapter in said memory adapter;

said memory adapter having at least one memory, said memory storing data sent from said second interface adapter; and

a switch adapter coupled to said processor adapter, said first interface adapter, said memory adapter and said second interface adapter and relaying data received at said second interface adapter between said second interface adapter and said memory adapter and relays said first control information between said first interface adapter and said processor adapter and relays said second control information between said processor adapter and said second interface adapter;

wherein said first interface adapter receives data stored in said memory adapter from said memory adapter based on a third control information sent from said processor adapter and sends data received at said first interface adapter to said host computer, and

wherein said switch adapter relays data stored in said memory adapter between said memory adapter and said first interface adapter and relays said third control information between said processor adapter and said first interface adapter, and

wherein the number of a plurality of processor adapters, which each correspond to said processor adapter, are increased or decreased based on a required performance.

43. (Currently Amended) A storage system coupled a host computer, said storage system comprising:

at least one disk drive;

at least one logical volume configured by said at least one disk drive;

a processor adapter having at least one processor and controlling to read data by determining a location from which the data should be read, the data being,~~which are~~ related to a read request sent from said host computer to said logical volume for reading data of said logical volume, from said disk drive;

a first interface adapter coupled to said host computer and receiving said read request and sending a first control information related to said read request to said processor adapter;

a second interface adapter receiving data stored in said disk drive from said disk drive based on a second control information sent from said processor adapter

and storing data received at said second interface adapter in asaid memory adapter;
and

saida memory adapter having at least one memory, said memory storing data
sent from said second interface adapter;

wherein said first interface adapter receives data stored in said memory
adapter and sends data received at said first interface adapter to said host computer
based on a third control information sent from said processor adapter,

wherein said processor adapter coupled to said first interface adapter and
said second interface adapter and receives said first control information from said
first interface adapter and sends said second control information to said second
interface adapter and sends said third control information to said first interface
adapter,

wherein said first interface adapter receives data from said memory adapter
among said processor adapter, said memory adapter and said second interface
adapter,

wherein said second interface adapter sends data to said memory adapter
among said processor adapter, said memory adapter and said first interface adapter,
and

wherein said memory adapter receives data from said second interface
adapter among said processor adapter, said first interface adapter and said second
interface adapter, and

wherein the number of a plurality of processor adapters, which each correspond to said processor adapter, are increased or decreased, if the number of said first interface adapter, said memory adapter and said second interface adapter are not increased or decreased.

44. (Previously Presented) The storage system according to claim 21, wherein the memory adaptor includes a control information memory module in which information for controlling data transfer are stored.

45. (Previously Presented) The storage system according to claim 36, wherein the memory adaptor includes a control information memory module in which information for controlling data transfer are stored.

46. (Previously Presented) The storage system according to claim 37, wherein the memory adaptor includes a control information memory module in which information for controlling data transfer are stored.

47. (Previously Presented) The storage system according to claim 38, wherein the memory adaptor includes a control information memory module in which information for controlling data transfer are stored.

48. (Previously Presented) The storage system according to claim 39, wherein the memory adaptor includes a control information memory module in which information for controlling data transfer are stored.

49. (Previously Presented) The storage system according to claim 40, wherein the memory adaptor includes a control information memory module in which information for controlling data transfer are stored.

50. (Previously Presented) The storage system according to claim 41, wherein the memory adaptor includes a control information memory module in which information for controlling data transfer are stored.

512. (Currently Amended) The storage system according to claim 42, wherein the memory adaptor includes a control information memory module in which information for controlling data transfer are stored.

522. (Currently Amended) The storage system according to claim 43, wherein the memory adaptor includes a control information memory module in which information for controlling data transfer are stored.